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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,109	02/03/2004	Jeremie Dalton	NOVLP082/002893	4875

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EXAMINER	
STARK, JARRETT J	
ART UNIT	PAPER NUMBER
2823	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/772,109	DALTON ET AL.	
	Examiner	Art Unit	
	Jarrett J. Stark	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/21*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's arguments filed 2/21/2007 have been fully considered but they are not persuasive..

The Applicant's submit that "neither Lopatin nor Erbil use a metallocene to passivate an exposed copper surface."

The Examiner respectfully traverses this statement. Loptin teaches in paragraph [0008] that it notoriously well known to one of ordinary skill in the art at the time of the invention to know

> "copper readily forms copper oxide when exposed to water and atmospheric conditions or environments outside of processing equipment and requires a passivation layer to prevent metal oxide formation."

Thus at the time of Lopatin's invention it was conventional to passivate a copper surface to prevent metal oxide formation.

Lopatin is however silent on specific prior art methods of passivating a copper surface. Therefore, the Erbil reference is combined with Lopatin to show at the time of Lopatin's invention and disclosure, it was known to one of ordinary skill in the art to passivate a copper surface with a metallocene. Erbil discloses the method of forming surface passivation layers by a CVD process using cyclopetadienyl metal compound (metallocene) precursors and an oxidizing agent. (Erbil, Abstract & Col. 12 line 3 → "products of this invention have a number of uses … surface passivation")

It would have been within the scope of one of ordinary skill in the art at the time of the invention to combine the teachings of Lopatin and Erbil to enable the passivation step of Lopatin to be performed according to the teachings of Erbil because one of ordinary skill in the art at the time of the invention would have been motivated to look to alternative suitable methods of performing the disclosed passivation step of Lopatin and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

It is also submitted that Erbil does not teach or suggest contacting an exposed copper surface with a metallocene. This statement, is respectfully traversed. Erbil discloses performing a CVD process using a metallocene on a surface of a substrate. Erbil, Col. 8, ln. 48-62 (see below) discloses that the substrate can be copper, thus Erbil is teaching the method of protecting an exposed copper surface by contacting the exposed copper surface with a metallocene compound.

> The substrate can be any material, usually either metallic or ceramic, on which an adherent metal oxide coating can be formed and which can be heated to a temperature above the decomposition temperatures of the precursor compounds. Thus, the substrate, can be a ceramic material such as glass or quartz, or a metal such as iron, nickel, titanium, tungsten, copper or aluminum. Aluminum and other low melting metals having melting points below 1000.degree. C. are not suitable when any precursor compound to be used has a decomposition temperature above or close to the melting point of the metal. Similarly, a glass whose softening point is below the decomposition temperature of any desired precursor compound cannot be used. Generally, only heat resistant glasses can be used.

In regards to when the exposed copper surface is contacted with an oxygen-containing environment, Erbil teachs contacting the exposed copper surface with the oxygen-containing environment both during and inherently after. (Note: the passivation is to prevent or reduce oxidation of the copper surface therefore exposure to an oxygen-containing environment after the passivation step is inherent. If the surface is not to be exposed to an oxygen containing environment, then there would be no need to passivate the surface to prevent /reduce oxidation, because oxidation is impossible without oxygen.) The claim language does not limit the step of contacting the copper surface with metallocene in an oxygen-free environment. The claims merely state "the method comprising:" which does not limit the claims to only the recited limitations.

The transitional term "comprising", which is synonymous with "including," "containing," or "characterized by," is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., Invitrogen Corp. v. Biocrest Mfg., L.P., 327 F.3d 1364, 1368, 66 USPQ2d 1631, 1634 (Fed. Cir. 2003) ("The transition comprising' in a method claim indicates that the claim is open-ended and allows for additional steps."); Genentech, Inc. v. Chiron Corp., 112 F.3d 495, 501,42 USPQ2d 1608, 1613 (Fed. Cir. 1997) ("Comprising" is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim.); Moleculon Research Corp. v. CBS, Inc., 793 F.2d 1261,229 USPQ 805 (Fed. Cir. 1986); In re Baxter, 656 F.2d 679, 686,210 USPQ 795, 803 (CCPA 1981); Ex parte Davis, 80 USPQ 448,450

In addition, during patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." In re Hyatt, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). While the claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allow. In re American Academy of Science Tech Center, F.3d, 2004 WL 1067528 (Fed. Cir. May 13, 2004) (The USPTO uses a different standard for construing claims than that used by district courts; during examination the USPTO must give claims their broadest reasonable interpretation.) This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) >; Chef America, Inc. v. Lamb-Weston, Inc., 358 F.3d 1371, 1372, 69 USPQ2d 1857 (Fed. Cir. 2004).

Furthermore, "the use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain." In re Heck, 699 F.2d 1331, 1332-33,216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting In re Lemelson, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. Merck & Co. v. Biocraft Laboratories,

874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989). See also Celeritas Technologies Ltd. v. Rockwell International Corp., 150 F.3d 1354, 1361,47 USPQ2d 1516, 1522-23 (Fed. Cir.1998).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months before the filing of the application in the United States.

Claims 1-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Erbil (US 4,927,670).

Regarding claim 1, Erbil discloses a method of protecting an exposed copper surface of a partially fabricated IC from oxidation during exposure to an oxygen-containing environment, the method comprising:

contacting the exposed copper surface (Erbil, Col. 8, ln. 48-62) with a metallocene compound (Erbil, Abstract); and

after passivating the exposed copper surface, contacting the exposed copper surface with the oxygen-containing environment, whereby exposure to the metallocene compound reduces formation of copper oxide on the exposed copper surface (Erbil, Abstract & Note: the passivation is to prevent or reduce oxidation of the copper surface

therefore exposure to an oxygen-containing environment after the passivation step is inherent. It is also noted that the claim language does not limit the step of contacting the copper surface with metallocene in an oxygen-free environment.);

wherein the metallocene compound contains a metal bound to one or more cyclopentadienyl ligands (Erbil, Abstract & Col. 3 line 66- Col. 4 line 3 – Group VIII metals).

Regarding claim 2, Erbil discloses the method of claim 1, wherein the metallocene contains a metal selected from the group consisting of ruthenium, cobalt, nickel, iron, palladium, platinum, titanium, chromium, osmium, and manganese (Erbil, Col. 3 line 66- Col. 4 line 3 – Group VIII metals).

Regarding claims 3 & 17, Erbil discloses the method of claim 1 & 12, wherein the metallocene is ruthenocene. (Erbil, Col. 3 line 66- Col. 4 line 3 – Group VIII metals includes ruthenium and a metallocene containing ruthenium is ruthenocene).

Regarding claim 4, Erbil discloses the method of claim 1, wherein contacting the exposed copper surface with a metallocene compound comprises flowing a gas containing metallocene over the partially fabricated IC (Erbil, Col. 2 lines 5-23).

Regarding claim 5, Erbil discloses the method of claim 1, wherein contacting the exposed copper surface with the oxygen-containing environment comprises contacting the exposed copper surface with a compound that forms a solid phase layer on the partially fabricated IC (Erbil, Col. 2 lines 5-23).

Regarding claim 6, Erbil discloses the method of claim 5, wherein the compound is a precursor compound that reacts with an oxygen-containing species to form the solid phase layer (Erbil, Col. 2 lines 5-23).

Regarding claim 7, Erbil discloses the method of claim 1, wherein contacting the exposed copper surface with the oxygen-containing environment comprises contacting the exposed copper surface with a diffusion barrier precursor, which reacts with an oxygen-containing species to form a barrier layer on the partially fabricated IC (Erbil, Col. 2 lines 5-23).

Regarding claim 8, Erbil discloses the method of claim 7, wherein the oxygen-containing species is molecular oxygen (Erbil, Col. 2 lines 5-23).

Regarding claim 9, Erbil discloses the method of claim 1, wherein contacting the exposed copper surface with the oxygen-containing environment comprises contacting the exposed copper surface with an etch stop precursor, which reacts with an oxygen-containing species to form an etch stop layer on the partially fabricated IC (Erbil, Col. 2 lines 5-23).

Regarding claim 10, Erbil discloses the method of claim 1, wherein contacting the exposed copper surface with the oxygen-containing environment comprises contacting the exposed copper with the ambient or other oxygen-containing environment during storage or transport between processing modules (Erbil, Col. 2 lines 5-23).

Regarding claim 11, Erbil discloses the method of claim 1, wherein the exposed copper surface comprises a copper seed layer on the partially fabricated IC (Erbil, Col. 2 lines 5-23).

Regarding claim 12, Erbil discloses a method of passivating and using an exposed copper surface of a partially fabricated IC, the method comprising:

contacting the exposed copper surface (Erbil, Col. 8, ln. 48-62) with a metallocene compound to thereby passivate the surface (Erbil, Abstract); and

wherein the metallocene compound contains a metal bound to one or more cyclopentadienyl ligands (Erbil, Abstract & Col. 3 line 66- Col. 4 line 3 – Group VIII metals) and

after passivating the surface depositing a layer of material on the partially fabricated IC using an oxygen-containing deposition chemistry (Erbil, Abstract).

Regarding claim 13, Erbil discloses the method of claim 12 further comprising performing the contacting and depositing step in a single chamber. (Erbil, Col. 2 lines 5-23).

Regarding claim 14, Erbil discloses the method of claim 12 wherein the depositing is conducted using the metallocene compound as a chemical precursor to the material. (Erbil, Col. 3 line 66- Col. 4 line 3)

Regarding claim 15, Erbil discloses the method of claim 12 wherein the contacting and depositing operations are done concurrently. (Erbil, Col. 2 lines 5-23).

Regarding claim 16, Erbil discloses the method of claim 12, wherein the metallocene is contains a metal selected from the group consisting of ruthenium, cobalt,

nickel, iron, palladium, platinum, titanium, chromium, osmium, and manganese (Erbil, Col. 3 line 66- Col. 4 line 3)

Regarding claim 18, Erbil discloses the method of claim 12, wherein contacting the exposed copper surface with a metallocene compound comprises flowing a gas containing metallocene over partially fabricated IC. (Erbil, Col. 2 lines 5-23).

Regarding claim 19, Erbil discloses the method of claim 12, wherein the depositing of a layer of material comprises contacting the exposed copper surface with a compound that forms a solid phase layer on the partially fabricated IC (Erbil, Col. 2 lines 5-23).

Regarding claim 20, Erbil discloses the method of claim 12, wherein the depositing of a layer of material comprises contacting the exposed copper surface with a diffusion barrier precursor, which reacts with an oxygen-containing species to form a barrier layer on the partially fabricated IC (Erbil, Col. 2 lines 5-23).

Regarding claim 21, Erbil discloses the method of claim 20, wherein the oxygen-containing species is molecular oxygen (Erbil, Col. 2 lines 5-23).

Regarding claim 22, Erbil discloses the method of claim 12, wherein depositing a layer of material comprises

contacting the exposed copper surface with an etch stop precursor, which reacts with an oxygen-containing species to form an etch stop layer on the partially fabricated IC (Erbil, Col. 2 lines 5-23).

Regarding claim 23, Erbil discloses the method of claim 12, wherein the exposed copper surface comprises a copper seed layer on the partially fabricated IC (Lopatin, [0016]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lopatin et al. (US 2005/0085031) in view of Erbil (US 4,927,670).

Regarding claim 1, Lopatin discloses a method of protecting an exposed copper surface of a partially fabricated IC from oxidation during exposure to an oxygen-containing environment, the method comprising:

contacting the exposed copper surface with a metallocene compound; and

contacting the exposed copper surface with the oxygen-containing environment, whereby exposure to the metallocene compound minimizes formation of copper oxide on the exposed copper surface (Lopatin, [0009]);

wherein the metallocene compound contains a metal bound to one or more cyclopentadienyl ligands (Lopatin's provisional application discloses "cyclopentadienyl ligands" bound to a metal on page 25 line 1).

Lopatin does not explicitly teach contacting the exposed copper surface with a metallocene compound to passivate the exposed copper surface. Lopatin's disclosed ALD process does not passivate the copper surface, Lopatin's surface remains active. Lopatin does however disclose in prior art Copper surfaces are conventionally passivated in order to prevent oxidation.

> [0008] However, copper readily forms copper oxide when exposed to water and atmospheric conditions or environments outside of processing equipment and requires a passivation layer to prevent metal oxide formation. Metal oxides can result in an increase in the resistance of metal layers, become a source of particles and reduce the reliability of the overall circuit.

At the time of the invention is was known to one of ordinary skill in the art to form surface passivation layers by exposure to a metallocene compound. For example Erbil discloses the method of forming surface passivation layers by a CVD process using cyclopetadienyl metal compound precursors and an oxidizing agent. (Erbil, Abstract & Col. 12 line 3 → "products of this invention have a number of uses ... surface passivation")

It would have been within the scope of one of ordinary skill in the art at the time of the invention to combine the teachings of Lopatin and Erbil to enable the passivation step of Lopatin to be performed according to the teachings of Erbil because one of ordinary skill in the art at the time of the invention would have been motivated to look to

alternative suitable methods of performing the disclosed passivation step of Lopatin and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

Regarding claim 2, Lopatin in view of Erbil discloses the method of claim 1, wherein the metallocene contains a metal selected from the group consisting of ruthenium, cobalt, nickel, iron, palladium, platinum, titanium, chromium, osmium, and manganese (Lopatin, [0083] & Erbil, Col. 3 line 66- Col. 4 line 3 – Group VIII metals).

Regarding claims 3 & 17, Lopatin discloses the method of claim 1 & 12, wherein the metallocene is ruthenocene. (Erbil, Col. 3 line 66- Col. 4 line 3 – Group VIII metals includes ruthenium and a metallocene containing ruthenium is ruthenocene).

Regarding claim 4, Lopatin in view of Erbil discloses the method of claim 1, wherein contacting the exposed copper surface with a metallocene compound comprises flowing a gas containing metallocene over the partially fabricated IC (Lopatin, [0080] & Erbil, Col. 2 lines 5-23).

Regarding claim 5, Lopatin in view of Erbil discloses the method of claim 1, wherein contacting the exposed copper surface with the oxygen-containing environment comprises contacting the exposed copper surface with a compound that forms a solid phase layer on the partially fabricated IC (Lopatin, [0009] & Erbil, Col. 2 lines 5-23).

Regarding claim 6, Lopatin in view of Erbil discloses the method of claim 5, wherein the compound is a precursor compound that reacts with an oxygen-containing species to form the solid phase layer (Lopatin, [0009] & Erbil, Col. 2 lines 5-23).

Regarding claim 7, Lopatin in view of Erbil discloses the method of claim 1, wherein contacting the exposed copper surface with the oxygen-containing environment comprises contacting the exposed copper surface with a diffusion barrier precursor, which reacts with an oxygen-containing species to form a barrier layer on the partially fabricated IC (Lopatin, [0012] & Erbil, Col. 2 lines 5-23).

Regarding claim 8, Lopatin in view of Erbil discloses the method of claim 7, wherein the oxygen-containing species is molecular oxygen (Lopatin, [0008] & Erbil, Col. 2 lines 5-23).

Regarding claim 9, Lopatin in view of Erbil discloses the method of claim 1, wherein contacting the exposed copper surface with the oxygen-containing environment comprises contacting the exposed copper surface with an etch stop precursor, which reacts with an oxygen-containing species to form an etch stop layer on the partially fabricated IC (Lopatin, [0009] & Erbil, Col. 2 lines 5-23).

Regarding claim 10, Lopatin in view of Erbil discloses the method of claim 1, wherein contacting the exposed copper surface with the oxygen-containing environment comprises contacting the exposed copper with the ambient or other oxygen-containing environment during storage or transport between processing modules (Lopatin, [0008] & Erbil, Col. 2 lines 5-23).

Regarding claim 11, Lopatin in view of Erbil discloses the method of claim 1, wherein the exposed copper surface comprises a copper seed layer on the partially fabricated IC (Lopatin, [0016] & Erbil, Col. 2 lines 5-23).).

Regarding claim 12, Lopatin in view of Erbil discloses a method of passivating and using an exposed copper surface of a partially fabricated IC, the method comprising:

contacting the exposed copper surface with a metallocene compound to thereby passivate the surface (Lopatin, [0083]) ; and

wherein the metallocene compound contains a metal bound to one or mor cyclopentadienyl ligands (Lopatin's provisional application discloses "cyclopentadienyl ligands" bound to a metal on page 25 line 1) and

depositing a layer of material on the partially fabricated IC using an oxygen-containing deposition chemistry (Lopatin, [0009]).

Regarding claim 13, Lopatin in view of Erbil discloses the method of claim 12 further comprising performing the contacting and depositing step in a single chamber. (Lopatin, Claim 65 & Erbil, Col. 2 lines 5-23).

Regarding claim 14, Lopatin in view of Erbil discloses the method of claim 12 wherein the depositing is conducted using the metallocene compound as a chemical precursor to the material. (Lopatin, [0083] & Erbil, Col. 3 line 66- Col. 4 line 3)

Regarding claim 15, Lopatin in view of Erbil discloses the method of claim 12 wherein the contacting and depositing operations are done concurrently. (Erbil, Col. 2 lines 5-23).

Regarding claim 16, Lopatin in view of Erbil discloses the method of claim 12, wherein the metallocene is contains a metal selected from the group consisting of ruthenium, cobalt, nickel, iron, palladium, platinum, titanium, chromium, osmium, and manganese (Lopatin, [0083] & Erbil, Col. 3 line 66- Col. 4 line 3)

Regarding claim 18, Lopatin in view of Erbil discloses the method of claim 12, wherein contacting the exposed copper surface with a metallocene compound comprises flowing a gas containing metallocene over partially fabricated IC. (Lopatin, [0080] & Erbil, Col. 2 lines 5-23).

Regarding claim 19, Lopatin in view of Erbil discloses the method of claim 12, wherein the depositing of a layer of material comprises contacting the exposed copper surface with a compound that forms a solid phase layer on the partially fabricated IC (Lopatin, [0009] & Erbil, Col. 2 lines 5-23).

Regarding claim 20, Lopatin in view of Erbil discloses the method of claim 12, wherein the depositing of a layer of material comprises contacting the exposed copper surface with a diffusion barrier precursor, which reacts with an oxygen-containing species to form a barrier layer on the partially fabricated IC (Lopatin, [0009] & Erbil, Col. 2 lines 5-23).

Regarding claim 21, Lopatin in view of Erbil discloses the method of claim 20, wherein the oxygen-containing species is molecular oxygen (Lopatin, [0008] & Erbil, Col. 2 lines 5-23).

Regarding claim 22, Lopatin in view of Erbil discloses the method of claim 12, wherein depositing a layer of material comprises

contacting the exposed copper surface with an etch stop precursor, which reacts with an oxygen-containing species to form an etch stop layer on the partially fabricated IC (Lopatin, [0009] & Erbil, Col. 2 lines 5-23).

Regarding claim 23, Lopatin in view of Erbil discloses the method of claim 12, wherein the exposed copper surface comprises a copper seed layer on the partially fabricated IC (Lopatin, [0016]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jarrett J. Stark whose telephone number is (571) 272-6005. The examiner can normally be reached on Monday - Thursday 7:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JJS
March 15, 2007

FERNANDO L. TOLEDO
PRIMARY PATENT EXAMINER